"10. In melting metals.

"11. In firing inflammable substances.

"12. The sulphurous smell. The electric fluid is attracted by points, and we do not know whether this property is in lightning. But since they agree in all the particulars wherein we can already compare them, is it not probable that they agree likewise in this? Let the experiment be made."

The early experiments with lightning-rods, and their gradual spread in Europe, are detailed in the succeeding chapters, with a variety of information of various kinds extremely interesting to the general reader, and dealing with such topics as the priestly opposition to the "heretical rods," the childish jealousy of the Abbé Nollet, and the dispute whether the rods should be furnished with points or balls at their summit. Sir W. Snow Harris's labours are treated of in a chapter by themselves, and another is devoted to full descriptions of the systems of lightning-protectors adopted in the Hôtel de Ville, Brussels, and in the Houses of Parliament—both complete in their way. A chapter on weather-cocks and the methods devised for making them do duty also as lightning-conductors, gives practical information on points which we do not recollect having met with elsewhere. The concluding sections deal with Newall's system of protecting buildings, with accidents from lightning—a black catalogue—and the book ends with two suggestively practical chapters on the earth connection and on inspection of lightning-conductors. Apart from mere literary merits, these two chapters constitute the strong point of the work. At great pains Mr. Anderson points out how a good earth connection is the alpha and omega of protection from lightning. He shows how the pretentious *paratonnerres* which adorn with their immense proportions so many thousands of buildings in France, often fail for want of thorough continuity to "earth;" and, after citing case upon case, declares as the result of his experience that "probably in nine cases out of ten, whenever a building provided with a conductor is struck by lightning, it is for want of 'good earth.'" He quotes Franklin's advice drawn up for the Royal Society in 1772, on the occasion of the Government providing protection for the great powder-magazines at Purfleet, that "at each end of each magazine a well should be dug, in or through the chalk, so deep as to have in it at least four feet of standing water," in which to terminate the conductors. Mr. Anderson prominently advises the utilisation of the systems of gas and water-pipes to this end in all buildings which stand upon a dry soil.

Very strongly, but not too strongly, does the author dwell on the importance of connecting to the main conductor all large masses of metal about a house, all lead roofs and gutters, all metallic ridge-tiles and roof-ornaments, and all water-spouts. In the absence of these he would even carry conductors over all the prominent edges of buildings. The foolish system of insulating the lightning-conductor from the building by glass or porcelain holders, he unsparingly condemns. With his remarks on the importance of periodic inspection of lightning-conductors to test by galvanometer and battery the actual efficiency of the rod, and, above all, its earth connection, we cordially agree. There can be no doubt that a bad conductor is far worse than no conductor at all; and that the inmates of many "protected" houses dwell—so far as their fancied security from lightning is concerned—in a fool's paradise.

The author describes a simple and portable form of apparatus specially adapted for testing the efficiency of lightning-conductors. It consists of three cells of a modified Leclanché battery of small internal resistance, a tangent galvanometer, and five keys for throwing at pleasure three different resistances into the circuit and comparing them with the resistance of the conductor.

While making no show of a knowledge of electrical theory, the author's language and arguments seldom clash with modern ideas as to the nature and laws of electricity. Nevertheless, in a work of this kind we should have been glad to find a little more direct reference to the scientific and theoretical aspects of the subject. We hardly think that the explanation given on p. 70 of the "return stroke" would be found adequate by one who met with the subject for the first time in these pages. The definitions of units given on p. 59 are unfortunately incorrect. The connection between the normal and abnormal electric conditions of the air is barely touched; indeed, the only reference to the subject of "atmospheric electricity" we have found in the text is to the rather antiquated views of Peltier. The researches of Sir W. Thomson, Dr. Everett, and others on this subject are not even alluded to. We regret that the author speaks somewhat disparagingly of the valuable little "note" on the protection of buildings, published a few years ago by Prof. Clerk Maxwell, and we think the author has not quite apprehended it, in the matter of the earth connection, in the sense intended by its late lamented writer.

The work contains also a list of books relating to the lightning-conductor, a list of all the important observations of accidents by lightning, and an excellent and singularly complete bibliography of the whole subject. The illustrations are numerous and good, and are free from the objectionable sensational character which writers on this and kindred topics sometimes tolerate.

S. P. T.

OUR BOOK SHELF

Medicinal Plants; being Descriptions, with Original Figures, of the Principal Plants employed in Medicine, and an Account of their Properties and Uses. By Robert Bentley and Henry Trimen. 4 vols. (London: J. and A. Churchill, 1880.)

It is not often that a reviewer can rise from a critical examination of a *livre de luxe* with such an unmixed feeling of satisfaction as in the case of these handsome volumes. At the close of their four years' labours the authors have succeeded in maintaining the high standard which they set before them at the outset. We do not mean that the level is absolutely uniform throughout. Admirable as the coloured plates—nearly all of them new—are on the whole, there are some few which fail in giving a perfectly satisfactory representation of the plant depicted. The letter-press descriptions also vary, in quantity if not in quality, for which the authors account "from the varying interest taken in substances at different times, some new remedies exciting much attention, and thus demanding a full description, though not, perhaps, of great permanent value." But when we recollect that the number of species described and depicted is 306, including every medicinal plant recognised by the official pharmacopœias of Britain, India, and the United States, with a few others in addition, small inequalities of this

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kind are to be expected rather than severely commented on; especially considering the imperfect material which the authors had in some cases at their command, and the doubt which still hangs over the origin and preparation of some drugs familiar to pharmaceutists in this country. Only in a few instances is the species depicted for the first time; but in all other cases it has been, where possible, drawn afresh either from a living plant or from a dried specimen in the herbarium of the British Museum. No botanist's or pharmaceutist's library will be complete without this work, which will long be the standard book of reference on all subjects connected with the origin, preparation, and uses of the products of medicinal plants.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

Novel Source of Frictional Electricity

I WISH to put on record the fact which I communicated to the Physical Society last week, that the motion of a chalk cylinder under a metallic surface generates an electric current having an E. M. F. of rather over one-third of a volt.[1] The strength of the current depends on the rate of rotation and the pressure on the surface of the chalk; the latter simply diminishes the internal resistance, which is of course very high. The discovery is due to a suggestion made to me so long ago as last November, by Prof. Silvanus Thompson, who wished me to try whether the motograph receiver of the Edison telephone could be used as a transmitter. I was unsuccessful at the time, but under favourable circumstances I find the voice is faintly but accurately transmitted on speaking into the receiver, so long as the chalk is made to rotate.

W. F. BARRETT

Royal College of Science, Dublin, March 1

Carnivorous Wasps

IN NATURE, vol. xxi. p. 308, there is a statement as to an exceptional case of carnivorous habits in honey-bees, which I can believe all the more easily, as I know that bees, apparently from a lack of their usual food, occasionally attack plums and other fruits, of which in ordinary seasons they take no notice.

Several years ago, when grouse-shooting in the county of Sutherland, I observed a wasp (a rare insect in those parts) struggling with something on the ground, and found that it was in the act of devouring a caterpillar, which was still alive, but considerably mangled by the mandibles of the wasp. In Sutherland this species of smooth, green caterpillar is abundant, and is a favourite food of the black game, whose crops are sometimes full of it.

Is it not unusual for the common wasp to eat living creatures of any sort?

To all of our party the thing appeared extraordinary, and I thought of writing to NATURE at the time, but omitted doing so until reminded of the occurrence by reading about bees devouring moths.

DAVID WEDDERBURN

March 2

Stags' Horns

MISS BIRD sends me, in answer to my inquiry, the following additional information as to the cast stags' horns found in the high valleys of the Rocky Mountains:—

"There are several small valleys opening from Estes Park, Colorado, which were resorted to by elks for the purpose of shedding their horns. In one of these, at the time of my visit in 1873, they lay quite thick. Some were quite recent, and others were bleached with age. I have not myself seen any but elk horns, but hunters told me that the spotted deer resorted to a valley near Long's Peak to shed their horns. I also came upon a large number of elk horns in a valley near Tarryall Creek, South Park, Colorado.

"Near Estes Park some of the horns were so recent and in such good order, that I hoped to procure some to take home; but on examining even the most recent closely, I found that they were all more or less injured by abrasion against some hard substance, as I thought. Two hunters, named Comstock and Nugent, told me that with good glasses, from certain points which they named, they had seen the elk violently rubbing their heads against the rocks, with the view, as they supposed, of ridding themselves of their horns. I am sorry that I cannot contribute more accurate observations on the subject."

B. W. S.

PIERRE ANTOINE FAVRE

WE are called upon to chronicle the death, at Marseilles, on February 17, of Prof. Pierre Antoine Favre, whose name is so intimately connected with the history of thermo-chemistry. Born at Lyons, February 20, 1813, he entered upon a career of scientific study at Paris, devoting himself especially to chemistry, under the direction of Peligot. After completing the usual course of study, he accepted a position in the laboratory of Prof. Audral, under whose guidance, as well as under that of Dr. Jecker, he made a series of researches in physiological chemistry. Returning to his former teacher, Prof. Peligot, at the Conservatoire des Arts et Métiers, in the capacity of assistant, he speedily created a reputation by his investigations in thermo-chemistry, and was appointed Assistant Professor of Chemistry in the Medical Faculty of Paris. After filling this position for nine years, Favre was appointed to the Chair of Chemistry in the Scientific and Medical Faculties of Marseilles. Here his marked abilities caused his election as Dean of the Scientific Faculty. Failing health forced him to give up the active duties of his professorship in 1878.

Favre's first research (1843) was on the atomic weight of zinc, and had in view the ascertaining of its being a whole multiple of that of hydrogen. Following this (1844) came an extensive research on mannite, yielding a number of new and important reactions. The most noteworthy of his investigations in physiological chemistry were those on the blood of persons suffering from scorbutic complaints (1847), in which he signalled an increase of fibrine and a decrease of the number of corpuscles and on the composition and properties of the perspiration of the human body (1852). For this latter purpose he succeeded in collecting no less than 40 litres of perspiration, a quantity which allowed him to discover the hydrotinic acid peculiar to this liquid, as well as to show the predominating presence of NaCl among its soluble constituents. Favre's only contribution to technical chemistry was his proposal in 1856 to decompose the refuse sulphides of the soda works by hydrochloric acid, and conduct the sulphuretted hydrogen liberated to the pyrite furnaces or into solution of sulphurous acid.

Apart from the above-mentioned researches, his career as an investigator—extending over a period of nearly thirty years—was devoted almost exclusively to solving the problems of thermo-chemistry, devising necessary apparatus of the most exact precision, gathering an enormous mass of experimental data, correcting and comparing the results of other workers, and elaborating the entire structure of this important branch of chemical physics. For the first six years J. T. Silbermann, like himself at the time assistant in the Conservatoire des Arts et Métiers, was associated with him in the investigations. The first requisite for the correct determination of thermic equivalents was a series of calorimeters of the utmost exactitude, and this want was met by the construction of the two well-known pieces of apparatus bearing the names of the two chemists. The first, intended for the determination of the heat given off by reactions between solids and liquids, consists of a large mercurial

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[1] The chalk had been impregnated some months before with a solution of phosphate of soda, but when used was practically dry, and had a hard, smooth surface, almost like polished marble.

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